Harnessing chaos: using the Geoweb as a tool to support social change

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Abstract

The Okanagan community is increasingly under threat from forest fires due to climate change and expanding development in fire interface zones. The effects of forest fires are not always quantifiable "hard" impacts. The fluid and chaotic "soft" impacts can have a profound effect on the collective consciousness of the people living close to the fires. To make sense of these impacts and understand where and when these forest fires have taken place, we have employed a Geweb tool to support citizen-to-citizen dialogue and tell the stories of these impacts. Governments are looking for ways to encourage citizen-government interaction; the Geoweb is increasingly used to facilitate the flow of data between the two. This presentation argues that the Geoweb offers greater opportunity for citizen-citizen interaction and combines many types of dissimilar data into a unified whole. To support fundamental social change there must first be clear understanding of the problems at hand followed by informal communication between members of a community. This presentation will explore the interlinked 'chaos' that exists between forest fires, governmental GIS and citizen contributed geographic information, as well as theorize about the role that the Geoweb plays in the transformation of chaotic individual sets of data into identifiable social change.

Background and Relevance

The Okanagan Valley is increasingly under threat from forest fires due to two inter-related issues, firstly the expanding development in forest fire interface zones and secondly climate change within the valley causing hotter and drier forest fire seasons. Severe forest fires in 2003 and 2009 led to thousands of evacuations and cost millions of dollars to combat. Forest fires are a yearly concern, yet the public awareness surrounding forest fires varies with the severity of the human impact. Forest fire modeling and prediction are currently the main areas of research in this field, leaving many human impacts ignored. The social construction of forest fires has been dominated by public awareness cycles and established information mediums. Citizen-citizen and many-to-many streams of information are lacking. Forest fire patterns, government information on forest fires and public opinion are all disaggregated and chaotic. This tool attempts to clear the confusion and the media maelstrom that often surrounds the annual forest fires in the Okanagan Valley through heightened discourse.

Quantitative attempts to predict or prevent forest fires using a variety of geographic information system (GIS) based tools are common (Castro & Chuvieco, 1998; Chuvieco & Congalton, 1989; Erten, Kurgun, & Musaoglu, 2002). For these studies the validity of the outcomes are contingent upon the technology

and epistemology used, weighing several quantifiable variables to produce a final prediction or action planning. The attempt is to turn chaotic natural systems into clearly ordered, predictable GIS models. Despite nature and natural events being fundamentally chaotic, with a myriad of small changes and movements leading to massive changes elsewhere, science attempts to control the chaos (Worster, 1994). For example, decades of fire suppression can ultimately yield an explosion in instances of wildfire when natural ecology's chaos can no longer be contained (Stephens & Ruth, 2005). Humanity's chaos mirrors that of ecology and fires in unpredictability and interaction. In studying natural events, or anything with a high level of unpredictability, it may be beneficial to refuse system simplification and organization and instead allow for randomness and multiple perspectives. Studies that integrate the views, perspectives and experiences of citizens through technology that is not confined to an 'expert-only' realm are needed to examine the impact of forest fires on human populations.

With the emergence of Geospatial Web (Geoweb), defined as "the use of the Internet to deliver geographic information and maps" (Haklay, Singleton, & Parker, 2008, p. 2011), geographic information and GIS are no longer usable solely by experts. Volunteered geographic information (VGI), whereby information is contributed by the public and verified and validated by other users (Goodchild, 2007a), is supported using Geoweb applications which allow the multi-directional flow of knowledge, including the knowledge, values and experiences of the general public (Turner, 2006). Connected populations are able to collectively construct geographical knowledge; the merits of VGI lie in the applications of citizens as sensors and citizen science (Goodchild, 2007b). This enables the production of Geoweb applications that can harvest and communicate information that is representative of community opinions and values "on a scale never before achieved" (Elwood, 2008, p. 174). GIS's attempted simplification of the world into data "points", "lines" and "polygons", working in absolute, positivist perspectives, represents an attempted control of the natural order of chaos. The attempt to overcome GIS's failings at representing fuzzy information and poorly represented data through tools like the Geoweb could be viewed as a failure of representing the chaotic nature of life.

While GIS and geographic information science (GIScience) attempt to apply rigid models to nature, VGI can allow for difference, and incorporate many opinions and ideas. Through use of the Geoweb and VGI, chaos can be embraced rather than barely contained. By utilizing the participatory potential of the Geoweb, public involvement can be supported and can utilize multiple forms of media and data. Furthermore, government data can be demystified, public opinion can be codified and random forest fire events can be visualized. Individually, all of this information is chaotic and incomprehensible or non-representative. The Geoweb is uniquely poised to take advantage of the intersecting chaotic systems of human interaction, forest fire behaviour and governmental data presentation. The result is a clearer picture of forest fire events than any individual source as well as a presentation system favouring the natural chaotic outcomes of the systems described above. However, on the flip side, due to a lack of expert accredited

quality control, issues have been raised over VGI's credibility. However, in the case of our Firemapping research project, we argue that when the aim is to organize and gather qualitative, personal accounts, credibility becomes less of an issue than in the technocracy (Flanagin & Metzger, 2008).

Methods and Data

While other research has examined forest fires through the lens of ecology, physical geography and GIS, this project seeks to provide new insight on the human impacts of forest fires in the Okanagan by providing a Geoweb portal (www.firehistory.ok.ubc.ca) upon which to facilitate the contribution of VGI. This portal revolves around a Google-based map of the Okanagan that displays polygons for forest fire burn areas at different periods of time (since 1984). The polygons are clickable, providing a page of statistics about the fire (date, total area burnt, probable cause) as well as news articles and other online information about the fires. To this, users are able to volunteer their own personal stories, experiences or photographs related to the forest fires. Through a mixed method (qualitative and quantitative) research methodology, this research explores the potential of the Geoweb to make chaotic data more understandable to the general public.

This presentation will report on the Geoweb's ability to harness the chaotic and foster citizen-citizen dialogue within the Okanagan related to the issue of forest fires and their human impacts. Distilling chaotic systems of governance, climate, forest fires, and human ecology into an easily understood and presentable format is a fundamental challenge of GIScience, but often remains unstated, and is usually difficult and reductionist in nature. We will re-examine the results of the first summer of usage of this tool, resolving issues from creation to launch and exploring the deeper meaning behind this notion of 'control' over the Internet and 'controlling chaotic information', chaos being inherent in the contributions, users themselves and official data all combined into this tool. Ultimately, it is an issue of controlling participation.

Results

Initial results regarding the reception of the Geoweb portal indicate a high level of interest, particularly from the media. To date, the project has been featured in articles in the Canadian Geographic, the Globe and Mail, interviews on CBC Radio and Global TV Okanagan. This interest level helps us gain more users, particularly during the summer, when forest fire risk is highest. Traffic to the website has noticeably increased, with new members and contributed data. In addition, a partnership with the Kelowna Fire Museum provides direction in terms of evaluating the website and helping to tell the "millions of stories" experienced by Okanagan community members. Using results from user surveys conducted last year the website is being updated and improved. The next step will be to evaluate the use of the website over the summer and conclude on its usability and public discussion potential during an active fire season.

Conclusions

The Okanagan Valley is increasingly under threat from forest fires due to two inter-related issues: the expanding development in forest fire interface zones and climate change within the valley resulting in hotter and drier forest fire seasons. This presentation reports on the ability for Geoweb applications to harness chaotic location-based experiences and foster citizen-citizen dialogue within the Okanagan on the issue of forest fires and their human impacts. By making use of the chaotic elements of data, rather than resisting, structuring or oversimplifying, the Geoweb and VGI can comprehensibly merge several forms of data to increase dialogue and understanding on an extremely important issue. This coalescing of data can aid in the creation and strengthening of community bonds and support social change.

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